

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Office of Engineering and Technology and)	GN Docket No. 19-128
Wireless Telecommunications Bureau Seek)	
Comment on Bidirectional Sharing Pursuant)	
to Ray Baum’s Act of 2018)	

COMMENTS OF T-MOBILE USA, INC.

T-Mobile USA, Inc. (“T-Mobile”)^{1/} submits the following in response to the *Public Notice*^{2/} in the above-referenced proceeding in which the Office of Engineering and Technology and Wireless Telecommunications Bureau seek to develop a record on bidirectional sharing, pursuant to RAY BAUM’S Act of 2018.^{3/} Congress’ directive to the Commission and the National Telecommunications and Information Administration (“NTIA”) to evaluate the best means to provide bidirectional sharing appropriately encourages both agencies to consider how spectrum can be used more efficiently to satisfy both Federal and non-Federal needs. In doing so, the Commission and NTIA must ensure that Federal and non-Federal entities have certainty so that they can continue to rely on spectrum access when they need it.

^{1/} T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

^{2/} See *Office of Engineering and Technology and Wireless Telecommunications Bureau Seek Comment on Bidirectional Sharing Pursuant to Ray Baum’s Act of 2018*, Public Notice, DA 19-371 (rel. May 1, 2019) (“*Public Notice*”).

^{3/} See Repack Airwaves Yielding Better Access for Users of Modern Services (RAY BAUM’S) Act of 2018, Pub. L. 115-141, § 610, 132 Stat. 1080, 1108 (2018). As the *Public Notice* explains, this Act requires that the Commission, in collaboration with NTIA, submit a report that examines aspects of providing Federal entities flexible access to non-Federal spectrum on a shared basis across a range of short-, mid-, and long-range timeframes, including for intermittent purposes like emergency use. See *Public Notice* at 1.

While T-Mobile recognizes the importance of Federal agencies having access to sufficient spectrum to meet their critical needs, the Commission must recognize that, unless structured carefully, spectrum sharing rules can significantly limit the utility of spectrum for commercial services both by imposing technical restrictions that limit efficient deployment or restrict flexibility and creating uncertainty that can deter investment. Both of these impacts can severely limit the potential economic benefits derived from use of spectrum by the public and can impede the ability of the U.S. to compete globally. Accordingly, NTIA and Commission rules to accommodate shared use should only be implemented when necessary and must be structured to prevent these potential negative impacts. In contrast, contractual agreements between parties for shared use can help ensure that both parties' needs are met and would be more efficient than forcing parties to share under overly conservative requirements based on worst-case assumptions.

I. RULE-BASED SHARING MUST PRODUCE CERTAINTY

In developing rules to promote sharing, the Commission and NTIA should acknowledge, as RAY BAUM'S Act directs, that both Federal and non-Federal users of spectrum need regulatory certainty in order to make long-term investment decisions.^{4/} That certainty takes two forms:

First, both sets of users require a stable regulatory environment. Once spectrum is designated for commercial use, it is vital that the rules regarding use of that spectrum remain the same, particularly when providers spend millions or billions of dollars at auction to acquire it.^{5/}

^{4/} RAY BAUM'S Act, § 610(b)(1); *Public Notice* at 1.

^{5/} For example, commercial users bid nearly \$2 billion for spectrum in the 24 GHz band. *See* News Release, *Clock Phase of Auction 102 Concludes*, FCC (Apr. 17, 2019), <https://docs.fcc.gov/public/attachments/DOC-357064A1.pdf>.

For example, recent attempts by Federal entities to raise claims of harmful interference to their operations from commercial use of the 24 GHz band after the conclusion of the Commission's rulemaking proceeding and the announcement of procedures for the auction of that spectrum are highly problematic.^{6/} Any legitimate concerns regarding spectrum use must be presented as part of the Commission's rulemaking process – not after the rules are finalized, disrupting investment-backed expectations. Last-second objections and attempts to change rules after the Commission's proceeding has concluded will dissuade non-Federal users from devoting the resources necessary to promptly deploy spectrum in their networks. While Federal concerns about non-Federal use of the 24 GHz band relate to adjacent-channel protection, the same certainty applies to sharing parameters. All parties require a stable regulatory framework to help ensure access to spectrum and drive investment.

Second, Federal and non-Federal users require a predictable geographic and temporal spectrum environment.^{7/} Under ideal spectrum planning circumstances, commercial providers would have 24/7/365 nationwide access to spectrum in order to provide a sufficient and reliable quality of service. However, in certain circumstances, providers can also use spectrum on a

^{6/} See Letter from Sen. Ron Wyden, Ranking Member, Senate Committee on Finance, and Sen. Maria Cantwell, Ranking Member, Senate Committee on Commerce, Science and Transportation, to the Hon. Ajit Pai, Chairman, FCC (dated May 13, 2019); Letter from Rep. Eddie Bernice Johnson, Chairwoman, Committee on Science, Space, and Technology, and Rep. Frank Lucas, Ranking Member, Committee on Science, Space, and Technology, to the Hon. Ajit Pai, Chairman, FCC (dated Mar. 13, 2019); Jason Samenow, *FCC To Auction Off Wireless Spectrum That Could Interfere With Vital Weather Data, Rejecting Requests from U.S. House and Science Agencies*, WASH. POST (Mar. 13, 2019), <https://www.washingtonpost.com/weather/2019/03/13/fcc-auction-off-wireless-spectrum-that-could-interfere-with-vital-weather-data-rejecting-requests-us-house-science-agencies/>.

^{7/} Through its Bidirectional Sharing Working Group, NTIA's Commerce Spectrum Management Advisory Committee ("CSMAC") has studied potential approaches to bidirectional sharing. For example, CSMAC has already examined geographically restricted operations, temporal sharing, and how bidirectional sharing can improve spectrum efficiency. See CSMAC Spectrum Efficiency Report, at 7 (July 24, 2018), https://www.ntia.doc.gov/files/ntia/publications/csmac_spectrum_efficiency_subcommittee_report.pdf.

more limited geographic and/or temporal basis if the sharing parameters are known and predictable. The AWS-1 and AWS-3 bands are examples of successful geographic sharing today between Federal and non-Federal users.^{8/} In both of these cases, the sharing parameters were established before the auction of the spectrum, and the parameters themselves were clear and well defined. In the AWS-3 band, for example, the Commission established protection zones to accommodate Federal and non-Federal users in the 1695-1710 MHz band.^{9/} The Commission similarly structured the AWS-1 band so that Federal incumbent operations were protected from commercial wireless licensees' operations through protection zones.^{10/} While non-Federal entities do not yet have full access to the 3.5 GHz band, that spectrum is another example of the establishment of criteria that permit sharing.^{11/}

^{8/} See *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, 29 FCC Rcd 4610, ¶ 220 (2014) ("AWS-3 Order"); *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Report and Order, 18 FCC Rcd 25162, ¶¶ 118-23 (2003) ("AWS-1 Order"); *The Federal Communications Commission and the National Telecommunications and Information Administration—Coordination Procedures in the 1710-1755 MHz Band*, Public Notice, 21 FCC Rcd 4730 (2006); see also Comments of T-Mobile USA, Inc., Docket No. 181130999-8999-01, RIN 0660-XC044, at 15 (filed Jan. 22, 2019).

^{9/} See *AWS-3 Order* ¶ 220. And in reducing the protection zones for the AWS-3 band, appropriate guidance was provided to both Federal and non-Federal users, giving them the regulatory certainty they need to continue operating in the band. To provide additional flexibility, protection was provided through use of coordination zones rather than exclusion zones. This approach allows Federal and non-Federal entities to directly coordinate on how to maximize use of the spectrum. See *The Federal Communications Commission and the National Telecommunications And Information Administration: Coordination Procedures in the 1695-1710 MHz and 1755-1780 MHz Bands*, Public Notice, 29 FCC Rcd 8527 (2014) (explaining that "[t]he FCC's approach in those bands is useful because federal needs are generally localized, while commercial needs are national").

^{10/} See *AWS-1 Order* ¶¶ 118-23.

^{11/} See *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959, ¶¶ 258-68 (2015) (establishing a two-phase approach wherein commercial operations will not be permitted within exclusion zones, but will then be permitted once those zones are converted to protection zones, except where Federal use in an area is reported).

Whatever the initial sharing parameters, NTIA and the FCC must continue to work together to refine, where feasible, the protection required by Federal entities and to allow coordination between Federal and non-Federal entities to further facilitate efficient use when appropriate. The 3.5 GHz band proceeding demonstrates that interference protection requirements for Federal users can be adjusted to be less restrictive for non-Federal users. In that proceeding, the Commission initially adopted stringent technical requirements for commercial devices that will operate in the band.^{12/} However, the Commission gradually relaxed those restrictions,^{13/} and the Wireless Telecommunications Bureau and the Office of Engineering and Technology, on their own motion and after collaboration with NTIA, recently granted a waiver of the Commission's rules to provide non-Federal users access to the band more quickly for certain higher-power uses without increasing the risk of interference to Federal incumbents.^{14/}

But even those improved sharing criteria remain limiting. As T-Mobile has explained,^{15/} out-of-band emissions and EIRP limits that are overly restrictive can limit the coverage that non-

^{12/} See *id.* ¶¶ 175-222 (adopting two categories of commercial devices that will be permitted to operate in the 3.5 GHz band – Category A for lower power (*e.g.*, small cell) and Category B for higher power operations – and establishing strict out-of-band emissions (“OOBE”) and maximum EIRP limits).

^{13/} See, *e.g.*, *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011, ¶¶ 67-84 (2016) (increasing the maximum allowable EIRP for non-rural Category B devices and eliminating the conducted power limits for all devices); *Promoting Investment in the 3550-3700 MHz Band*, Report and Order, 33 FCC Rcd 10598, ¶¶ 124-39 (2018) (relaxing the OOBE limits within the 3.5 GHz band for end user devices to accommodate bandwidths wider than 10 megahertz).

^{14/} See *Promoting Investment in the 3550-3700 MHz Band*, Order, 33 FCC Rcd 4987, ¶ 2 (2018) (explaining that Federal incumbent operations in the 3.5 GHz band will be protected “using dynamic and precisely tailored protection criteria rather than static Exclusion Zones” and that these dynamic protection areas were developed in collaboration with NTIA); see also Letter from Paige R. Atkins, Assoc. Admin., Office of Spectrum Mgt., NTIA, to Julius P. Knapp, Chief, OET, FCC, and Donald Stockdale, Chief, WTB, FCC (dated May 17, 2018).

^{15/} See, *e.g.*, Petition for Rulemaking of T-Mobile USA, Inc., RM-11789, GN Docket No. 12-354, at 21 (filed June 19, 2017); Comments of T-Mobile USA, Inc., RM-11788, RM-11789, GN Docket No. 12-354, at 2-3 (filed July 24, 2017); Reply Comments of T-Mobile USA, Inc., RM-11788, RM-11789, GN Docket No. 12-354, at 14-18 (filed Aug. 8, 2017).

Federal users can achieve. The specific power limitations imposed on non-Federal users of the 3.5 GHz band severely restrict the utility of the band for the deployment of mobile 5G services and are not aligned with global use of the band. This puts the U.S. at a competitive disadvantage as manufacturers and service providers compete on a global stage for equipment and to drive the development of innovative services and applications.

T-Mobile supports the protection of Federal operations, but protections should not be unnecessarily conservative and should be related to the engineering-based, anticipated impact to the potentially affected Federal systems. For example, the Commission established protection zones for the AWS-3 band based on an NTIA-approved report of a CSMAC Working Group, which adopted interference protection criteria based on an interference-to-noise (“I/N”) ratio of -10 dB.^{16/} Despite concerns raised by non-Federal participants, the protection criteria was established without evaluating whether this level of protection was warranted or what impact it would have on the Federal operations. In that case, NTIA should evaluate whether reducing its overly-conservative interference protection criteria or utilizing other interference protection criteria, such as a carrier-to-interference ratio (“C/I”), may be more effective and improve spectrum sharing without unnecessarily limiting access for non-Federal users. Had those conditions been in place during the AWS-3 transition, much of that spectrum may already be in commercial service while still protecting Federal operations.^{17/}

^{16/} See *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Order on Reconsideration and Notice of Proposed Rulemaking, 28 FCC Rcd 11479, ¶ 62 (2013); *AWS-3 Order* ¶¶ 11, 13, 16-20.

^{17/} See INTERFERENCE PROTECTION CRITERIA, Phase 1 - Compilation from Existing Sources, NTIA, at ii, 2-2 (Oct. 2005), https://www.ntia.doc.gov/files/ntia/publications/ipc_phase_1_report.pdf (explaining that interference protection criteria are generally given in terms of I/N power or C/I ratios – the former defining the level of interfering signal level relative to the system noise level, and the latter defining the interfering signal level relative to a known carrier level – and that interference protection criteria have often been based on an I/N power ratio of -6 to -10 dB).

Even flexible geographic parameters, like those adopted for satellite sharing in millimeter wave bands (albeit in that case between non-Federal terrestrial and satellite users),^{18/} can produce effective spectrum sharing so long as they provide sufficient certainty.^{19/} In any case, as T-Mobile recently explained,^{20/} unbounded sharing is *not* a tenable solution. Without specific guidance as to when, where, or how much spectrum may be needed, neither Federal nor non-Federal users will be willing to invest in and deploy spectrum resources.

II. REGULATIONS SHOULD ALSO BE AMENDED TO PROMOTE COMMERCIAL SHARING ARRANGEMENTS

In addition to rule-based sharing, T-Mobile recommends that the Commission and NTIA amend their respective regulations, to the extent required, to permit commercial sharing arrangements.^{21/} Section 2.103 of the Commission's rules permits Federal entities to use non-

^{18/} See *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, ¶ 54 (2016) (determining that an earth station could operate on a protected basis in the same band – the 28 GHz band – as terrestrial licensees provided that: (i) no more than three earth stations are located in the same county; (ii) the earth station's protection zone together with the protection zones of other earth stations in the same county do not, in the aggregate, cover more than 0.1 percent of the population of the county; (iii) the earth station's protection zone does not infringe upon any major event venue, arterial street, interstate or U.S. highway, urban mass transit route, passenger railroad, or cruise ship port; and (iv) if the earth station relocates to an area where there is an existing terrestrial licensee, the earth station coordinates its operations with that licensee). See also *id.* ¶ 93 (adopting a similar approach for the 37.5-40 GHz band).

^{19/} As CSMAC has pointed out, there are already instances where Federal/non-Federal sharing occurs successfully under specific parameters, pursuant to the Commission's and NTIA's rules. See CSMAC Bi-Directional Sharing Working Group Draft Report, at 7 (Mar. 26, 2014), https://www.ntia.doc.gov/files/ntia/publications/csmac_bi-directional_sharing_draft_report.pdf. The Commission's actions in response to RAY BAUM's Act should be informed by both the record in this proceeding and the work that CSMAC has already performed.

^{20/} See Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, and John Hunter, Senior Director, Technology and Engineering Policy, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 14-177 (filed on Apr. 5, 2019).

^{21/} T-Mobile recognizes that Congressional authority may be required to permit Federal entities to share spectrum, and generate fees from the shared use of that spectrum, with non-Federal entities. In particular, the Miscellaneous Receipts Act requires an agency receiving money from any source to deposit that money into the U.S. Treasury instead of retaining it. See 31 U.S.C. § 3302(b). The Commission could recommend a limited-purpose exception to the Miscellaneous Receipts Act that enables direct payments from commercial users to federal agencies for spectrum sharing. T-Mobile urges

Federal spectrum, but only under certain circumstances – generally for public safety operations.^{22/} And the NTIA Manual of Regulations and Procedures authorizes Federal access to a wide range of non-Federal bands, but generally only for military tactical and training operations.^{23/} The Commission and NTIA can, and should, amend their rules to permit Federal and non-Federal entities to share their respective spectrum resources pursuant to commercial agreements, regardless of the circumstances. Non-Federal licensees could, for example, allow Federal use of portions of their spectrum in remote areas where they have fewer customers and Federal users have greater or unique needs.

Similarly, the Commission and NTIA should amend the Table of Allocations to permit Federal entities to use any spectrum held by commercial entities, subject to the same technical limitations as the commercial license. Federal entities should be allowed to acquire spectrum rights as they would any other asset, provided that their use is agreed to by non-Federal entities and that they comply with the Commission's and NTIA's rules.

In order for commercial sharing arrangements to be truly bidirectional, Federal entities should also have the authority to lease – on a long-term or short-term basis – spectrum on a geographic or temporal basis to non-Federal licensees.^{24/} This arrangement would not only

the Commission to include any required recommendations for legislative change, as envisioned by RAY BAUM's Act, in its required report to Congress.

^{22/} Section 2.103 of the Commission's rules generally permits Federal entities to be authorized to use non-Federal spectrum under three circumstances: (1) for all spectrum except the 700 MHz public safety bands, for coordination of Federal and non-Federal activities; (2) for public safety 700 MHz narrowband and 4.9 GHz spectrum, for interoperability purposes; and (3) by FirstNet. *See* 47 C.F.R. § 2.103. In addition, footnotes US92 and US346 to the U.S. Table of Allocations provide that military services may use the 2025-2110 MHz band. *See id.* § 2.106.

^{23/} NTIA Manual, Annex O (Relocation or Sharing by Federal Government Stations in Support of Reallocation) § O.5.1 (Negotiation and Coordination with Non-Federal Users).

^{24/} *See* CSMAC Bi-Directional Sharing Working Group Draft Report (Mar. 26, 2014), https://www.ntia.doc.gov/files/ntia/publications/csmac_bi-directional_sharing_draft_report.pdf.

produce revenues to the benefit of taxpayers, but would also preserve a Federal entity's discretion to determine the type of commercial operations that can be effectively shared with its existing and planned operations.

Sharing arrangements could occur pursuant to the Commission's existing *de facto* leasing rules, provided that the rules are broadened to include Federal entities.^{25/} Under this approach, sharing would occur on a voluntary basis, pursuant to terms that are useful to both the commercial and Federal user, and the parties would submit the necessary application and notifications to the Commission and NTIA. Such sharing arrangements would encourage both parties to use the spectrum as efficiently as possible to meet their respective needs and to negotiate efficient technical sharing conditions.

Nevertheless, sharing between Federal and non-Federal entities should not be required. Imposing a mandatory sharing obligation will depress the utility of – and commercial users' willingness to pay for – spectrum. Voluntary commercial sharing arrangements, like leases, are the more appropriate vehicle for spectrum sharing in instances where clearly defined requirements are absent, particularly when they can be used to allow Federal access to non-Federal spectrum to meet short-term, intermittent or emergency uses, where commercial users can determine if spectrum capacity may be considered excess for a particular period.

III. CONCLUSIONS

T-Mobile appreciates the Commission's ongoing efforts to make more efficient use of spectrum. In evaluating bidirectional sharing and developing rule-based sharing, the Commission and NTIA should ensure that rules are clear and promote a stable regulatory and spectrum sharing environment. The Commission and NTIA should also, in addition to

^{25/} See 47 C.F.R. §§ 1.9010, 1.9030, 1.9035.

establishing rule-based sharing, modify their rules and procedures to promote commercial sharing arrangements between Federal and non-Federal entities.

Respectfully submitted,

/s/ Steve B. Sharkey

Steve B. Sharkey

John Hunter

Christopher Wieczorek

T-MOBILE USA, INC.

601 Pennsylvania Avenue, N.W.

Suite 800

Washington, DC 20004

(202) 654-5900

May 31, 2019